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DOCUMENT MANAGEMENT FOR SMALL BUSINESS

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DOKUMENTINHALLINTA PIENYRITYKSELLE

Opinnäytetyön tarkoituksena oli selvittää dokumentinhallinnasta olennaisimmat asiat, joita tarvittiin dokumentinhallintajärjestelmän valintaan. Työssä perehdyttiin dokumentinhallintajärjestelmiin ja niiden eroihin. Työn tavoitteena oli löytää toimeksiantajalle sopivin järjestelmä ja määrittää prosessit yritykselle dokumentinhallintaan.

Työn teoriaosuudessa perehdyttiin erilaisiin dokumentinhallintajärjestelmiin ja muun muassa dokumentinhallintajärjestelmien perusominaisuuksiin ja arkkitehtuuriin. Kehitystyössä tutustuttiin myös prosessien laadintaan, vaatimusmäärittelyyn ja neljään eri dokumentinhallintajärjestelmään syvällisemmin.

Kehitystyön aikana suoritettiin dokumentinhallinnasta kyselytutkimus, joka käydään myös opinnäytetyössä läpi ja sitä hyödynnettiin kehitystyön myöhemmissä vaiheissa. Kyselyllä selvitettiin mitä yrityksen työntekijät odottavat dokumentinhallintajärjestelmältä ja millaista dokumentinhallintaa yrityksessä harjoitetaan tällä hetkellä.

Työn tuloksena kartoitettiin yritykselle sopivia järjestelmiä ja valittiin yrityksen tarpeisiin ja tilanteeseen sopivin järjestelmä. Tuloksena yritykselle tehtiin prosessit dokumentinhallintaan ja vaatimusmäärittely dokumentinhallintajärjestelmän valintaan.

ASIASANAT:

dokumentinhallinta, dokumentinhallintajärjestelmä, IT-arkkitehtuuri

MASTER´S THESIS | ABSTRACT

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DOCUMENT MANAGEMENT FOR SMALL BUSINESS

The objective of the thesis was to find out the most important things about document management which are needed for selecting a proper document management system for a small business. The thesis explores several document management systems and the differences between them. The goal of the development project was to find the most suitable system for the client and to define document management processes for the company.

The theory part of the thesis focuses on different document management systems and among other things the basic features of document management systems and architecture. During development work the thesis takes a look into creating processes, requirement analysis and more deeply into four different document management systems.

A staff survey was done about document management for the thesis, which is reviewed and used for requirement analysis in later part of the development process. Survey was used to discover what employees except from document management system and what kind of document management there is already in the company.

One result of the work was the mapping of document management systems for the company and selecting the most suitable one. Also as a result, the client received processes for document management and requirement analysis done for the document management system.

KEYWORDS:

Document management, document management system, system architecture

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ABBREVIATIONS

SME	Small and medium-sized enterprises
XML	Extensible Markup Language
EDIFACT	Electronic Data Interchange for Administartion, Commerence and Transport
DMS	Document Management System
CRM	Customer Relationship Management
NAS	Network Access Storage

1 INTRODUCTION

Document management is often considered unimportant, especially in small companies where the document management may initially be done on the company founder's hard-drive, and at a later point through network sharing. This often leads to a problem where there is no defined process for document management and the employees handle and store documents differently. This may cause chaos and a lot of duplicate work. This thesis work considers document management in SME company AgentITClient AgentIT Finland Oy

"AgentIT Finland Oy was founded in 2004. The company has two offices, in Helsinki and in Turku. AgentIT has customers from about 30 large-scale enterprises and organizations. AgentIT's business activities are growing in a controlled way. Committed staff is motivated, skillful and having a long experience in the field of business." (AgentIT Finland Oy webpages, 2015)

AgentIT offers a number of services for different customer needs. Those services are mainly in the IT field, related to system integrations and everything around it. AgentIT also has All-in-One validation service for XML/EDIFACT messages, which is called Truugo. (Truugo webpages, 2015)

1.1 Starting point

In AgentIT, document management is not in chaos but the employees have problems in finding specific documents and also in knowing whether it is the correct version or not. The documents are stored in multiple places and edited by several employees, which makes it even harder. There are times when all goes well and all versions of the documents are easily traced and found. However, that is too often based on luck. For AgentIT, a working document management (system) can also be a part of the company's competitiveness.

1.2 Background, definition of the thesis and purpose of the work

There is a clear need for a unified document management system in the company since there are now a few different document management systems in use that are selected to fulfill certain specific needs. One of the goals is to find out how they are used and what is the employees' position about document management and what are their needs.

In the very beginning, the scope of the project was wider. Listed goals in the first project meeting were:

- General investigation into what is document management (system)
- Investigation of different document management systems
- Suggestion of selected document management system(s)
- Adaptation of document management system(s) for company's needs
- Create guidelines for the company regarding the following:
    - What should be documented
    - How should it be documented
    - When it should be documented
    - Templates
    - Approval process
    - Develop foundation for quality system

After reading about document management systems and quality systems it was clear that there was a need to limit the project so that it would be reasonable for this thesis and continue the development as a separate project after the thesis is done.

After limiting the scope of the project, the new goals were set as follows: a general investigation about document management (system), creating document management processes for the company, exploring of different document management systems, and the selection of a proper document management system.

2 DOCUMENT MANAGEMENT

A document is drawn, written, recorded or presented representation of thoughts. It can be defined in multiple ways. Documents are things that represent organized packages of data within a company. (Sutton 1996, 6) For example, those packages can be e-mail messages, notes, studies, and so on. When defining document in companies there are some gray areas around it. In this thesis a document is defined to be an electronic (document) record or file containing data that needs to be retained for possible later use. Existing printed documentation will not be moved to new document management system.

Main objectives of an organization's documentation are communication of information, evidence of conformity and knowledge sharing. Those objectives mean using documentation as communication and information transmission tool. The extent and type of the documentation depends on organizational culture, the nature of organization's processes and the degree of formality in communication. Documentation serves as evidence that what was planned, has been done. For knowledge sharing, a typical example is technical specification, which may be used developing and designing something. (ISO 9000 Introduction and Support Package: Guidance on the Documentation Requirements of ISO 9001:2008, 2015)

Now to define the word "management" especially as it applies to documents. A commonly accepted definition is "where management is the design and maintenance of an environment in which resources, organized in groups, can attain, common objectives through efficient and effective performance". (Sutton 1996, 7)

Companies deal with a large amount of information daily. Efficient use of that information is very important for the performance of the company. In the past, the majority of the company documents was in paper format, but is no longer the case as during the past decades IT and electronic documents have come part of daily work for every office employee. Documents in electronic formats are pro-

duced in increasing amounts. These documents contain deals/agreements, manuals, e-mail messages, web-pages and so on. One reason for the continuum of growth is the fact how easy it is to produce electronic documents. Also systems for doing that are more and more easy to use and available. (Anttila 2001, 1-2)

From this we come to the main question: ”What is document management?”. Traditional document management in companies was achieved by programs for archives management, reports management, forms management, directives and manuals management and records management. During the last 35 years or so, traditional document management programs have been forgotten. This is because of the difficulty of storing electronic records in systems designed for paper, missing a definitive document centered process model and the sheer number of transactions generated in the course of business. (Sutton 1996, 9)

Document management means the full control of the lifecycle of a document. It defines how a document is created, verified, published, used and finally archived or removed. (Figure 1) Large corporations usually have a document management system in use. In smaller companies, however, the investment has been done into systems creating the documents and there has been only limited interest for investing to document management systems. However, even for small companies the use of a document management can be profitable. It is also becoming more and more valuable even for small companies as number of electronic materials keeps growing and growing.

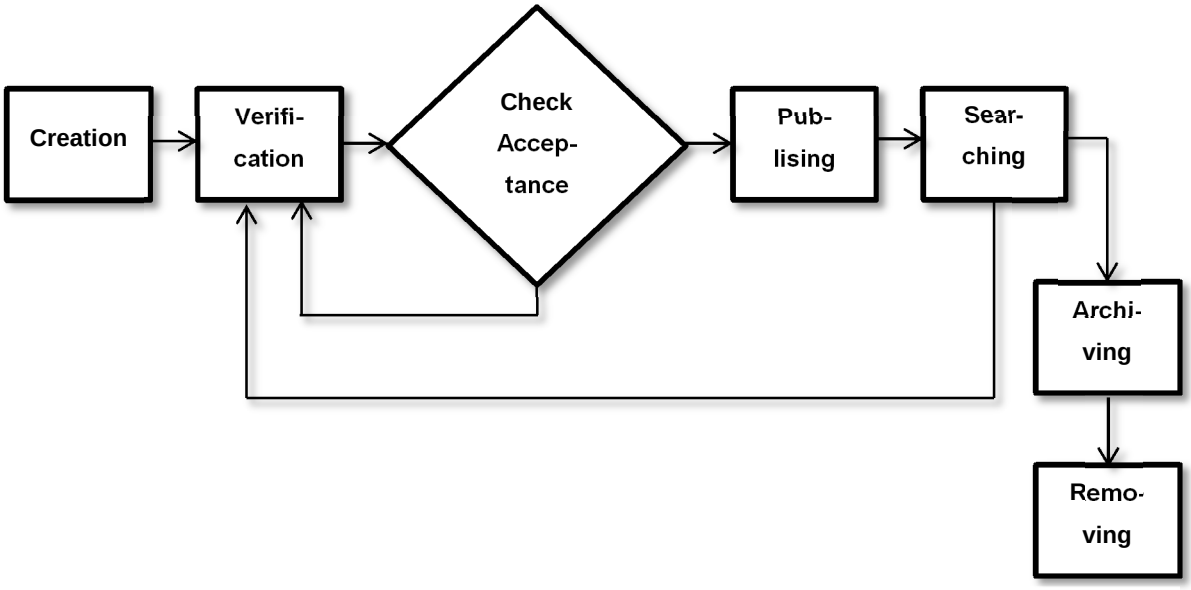

Figure 1: Document's lifecycle (Anttila 2001, 5)

In a nutshell document management is the systematic method for storing, locating, and keeping track of information that is valuable to the company. The key characteristics of a document management system are: providing the possibility to manage and collaborate when creating information, to allow secure access to all people needed, and to distribute the information.

2.1 Document management system

Document management systems (DMS) are used to manage electronic documents. DMS is usually capable of tracking documents, storing documents and keeping track of document history. (Wikipedia: Document Management System, 2015) Simplest level of DMS is a folder structure on the user's PC in where word docs, PDFs, spreadsheets and so on are stored. Main difference between that and a DMS provided by a vendor is the scale of what is being managed. The idea of DMS is to help the entire organization by using it to create, store, retrieve and expire documents. Unlike the folder structure on personal computer, DMS usually revolves around repository of information (documents), and is quickly accessed by anyone. (Contentmanager: DMS, 2015)

2.2 Basic features of document management system

Different document management systems differ by functions and features. The most basic thing for centralized DMS is that they require a database where the document information is saved. In addition to a database, file storage for documents is needed and a link is created between the two. There are some other basic features in systems as well. Some systems also offer some special features and functions, which are oriented for a specific user group. Some of the most basic features are listed below. (Anttila 2001, 19)

- Web interface
- Meta-data of documents, stored in the database
- Access rights of documents
- Checking out/in of documents
- Version control of documents
- Document search and indexing
- Backups
- Workflow management

2.2.1 Database

Definition of the word database is “a collection of data that is organized especially to be used by a computer”. (Merriam-webster dictionary, 2015) A database contains a collection of schemes, tables, reports, views, queries and other objects. The data is usually organized according to model aspects of reality so that it supports processes, which require information from the database. (Wikipedia: Database, 2015)

Database management systems can be used to interact with databases. Database management system is a computer software application, which interacts with the database, with other applications, or with the user to analyze and capture data. Well-known database management systems are Microsoft SQL Server, Or-

acle, Sybase, PostgreSQL, MySQL and IBM DB2. Database management systems are often classified by the database model they support. Most popular database models currently support relational model. (Wikipedia: Database, 2015)

2.2.2 Web interface

A web interface does not require any client software to be installed on user's computers. This is a huge benefit as it enables possibility to do all the basic functions to the documents stored in the DMS. It does not limit access or data control for users making it possible to work anywhere. Web interface also provides cross-platform compatibility in most cases, for example Mac, Windows, Linux. (Wikipedia: Web applications, 2015)

2.2.3 Metadata

The simplest definition of metadata is data about data. It summarizes basic information about data, which makes finding and working with data easier. Basic document metadata can be found in TABLE 1 below. It makes a lot easier to locate specific documents. (Techtarget: metadata, 2015) Some of the metadata can be and should be generated automatically, like modified date for example. Some of the metadata should be defined manually for it to be more accurate. Manually defined metadata can be for example the version, change-log, and description of the document. It is possible to choose which metadata are mandatory and which are optional. There can also be default options and those can be reliant of each other. (Anttila 2001, 20)

Table 1: Document meta-data

Name	Value
Name of the document	Tender123
Version	2.1
Version comments	Added syllabys
Created date	14.1.2015 15:15
Modified date	16.1.2015 12:11
Category	Tenders
Description	Tender to Company X about Y
Author	Maija Mallikas

2.2.4 Access rights of documents

All companies have their internal information that cannot be disclosed to public. For example confidential personnel data is not intended for all people to see, neither are newly developed software code or new tenders. The common thing with all this information is that it should only be available to certain people inside or outside of the company. DMS's job is to ensure that those access rights can be kept and maintained easily. (Arcflow, 2005) This is one of the most essential functions of a document management system. Different systems have different ways to manage access rights and those are often bases on the system's technical principle.

User access to documents is limited and monitored by the DMS. Because of this, all users should only use their own account so that the rights are determined correctly. Access rights in document management systems resemble normal file systems rights. The rights however can differ for meta-data and for files. When high level security is needed, rights to the meta-data and files should be the same. It is also recommended that user cannot see in his/her search results data he/she has no access to. The access rights can be file or folder specific. It is common that user can define access rights to single user or user group. (Anttila, 2001, 35)

2.2.5 Checking documents in/out

Check-in and check-out are very common terms in document management systems. The purpose of this is to prevent conflicts in environments where more than one people could want to edit he same document at the same time. Check-out is the term for getting the latest version of a document and blocking it from editing. Other users can still read the checked-out document. After that when checking in user can be sure that he/she does not overwrite changes done by others and allows others to edit the document again. (Informit.com, 2015)

2.2.6 Version control

”Version control is the means by which different versions and drafts of a document (or file or record or dataset) are managed.” (University of Leicester webpages, 2015)

It requires a process of naming and spotting the difference between the final version and series of drafts which lead to it. The final may be subject to further amendments. When a document is created and developed, version control allows users to identify the development of the document. That allows retention of drafts and gives details on what changes has been made. It also shows all collaborators within the document development, the order of possible changes and list of final document approved. That is called traceability and it is one of the benefits in version control.

Version control also gives clarity between different versions of documents and makes it easy to identify the latest version. It makes it possible to link documents to contributions, contributors, time and decisions. Version control reduces duplication as old and out of date copies can be destroyed. Also all versions can be deleted from user computers as the definite version is stored in electronic storage. (University of Leicester webpages, Version control, 2015)

Most document management systems allow version numbering according to the company's needs. It is common to use two level of versioning. Main version is often used to identify published versions of documents. To identify version letter, number or both can be used. For example 1.0, 2.0, 3.0 and so on. Subversions are usually used to mark documents under development. For example for a document with version 1.0, the subversions could be 1.1, 1.2, 1.3 etc. and when it is finished and published its version is 2.0. (Anttila, 2001, 37)

In document management systems it is possible to use a version control table, which some systems can generate automatically. The version control table is updated every time a change is done to a document. Most common information in version control table are: version number, author, purpose, change, date. (University of Leicester webpages, Version control, 2015)

Table 2: Example of version (control) history table

Date	Version	Information	Author
12.12.2012	0.1	Initial draft	Maija Mallikas, Project manager
16.12.2012	0.2	Consultation draft	Maija Mallikas, Project manager
20.12.2012	1.0	Final version, approved by Business Manager Agent X	Maija Mallikas, Project manager
03.06.2014	1.1	Revision of plaa	Matti Meikäläinen, Project manager
20.06.2014	2.0	Final version, approved by Business Manager Agent X	Matti Meikäläinen, Project manager

2.2.7 Document search and indexing

One of the most important points in document management systems is the fast discovery of documents. It is also one of the most problematic functions. Full-fledged DMS makes it easy for the user to find what is needed /searched. Retrieval of documents needs to be fast, easy and efficient with multiple methods of

categorizing information. Indexing (categorizing) allows users to sort large amounts of data quickly to find the document they are searching for. Whatever the combination of categorizing methodologies, the search methods needs to be easily used and understood by people who are in need of finding specific documents and also for those who upload documents to the system. (Laserfiche, 2007, 17)

Three primary indexing ways in document management systems are indexing by associated document groups (folder/file structure), indexing through keyword categories (template fields), and full-text indexing. Full-text indexing allows users to search any word or phrase that appears in any document indexed. It eliminates the need to manually index documents using keywords or meta-data. Meta-data can still be very useful. It translates words into alphanumeric characters with almost perfect accuracy thus enabling each occurrence of a phrase or word to be tracked by the software. There are some helpful ways to get everything out of full-text searches (Laserfiche, 2007, 18):

- Wildcards: A common wildcard is asterisk, which can be used to match zero or more characters. For example, user could search with ”c*t” and results could be ”cat”, ”coat”, ”cut” and ”chest”
- Near-Match searches: Look for spelling variations and by doing that compensate for misspells.
- Boolean operators: Can be used to fine-tune searches and to decrease unrelated results. AND, OR and NOT are boolean operators.
- Proximity searches: Can be used also to narrow down the results. For example looking for tender to operator, user could search for ”tender” within one sentence of word ”operator”

2.2.8 Backups

Process of backing up, also known as backup, refers to archiving and copying computer data so that it can be used to restore lost data ie. after natural disaster, hard-drive break or data corruption. When something unexpected happens to company’s data, in this case document database (meta-data / DMS settings) and there are no backups, it is a major blow to any company. There are multiple

techniques to optimize the backup procedure. Techniques include optimization for live data sources, encryption, de-duplication and so on. (Wikipedia: Backup, 2015)

Hence, backups are an essential part of document management systems. It is necessary to back up meta-data, system settings and of course documents. Some systems also store documents to database, which makes it easier to back up, as only the database needs to be backed up. Otherwise the documents have to be backed up by a separate process. Also systems can be stored elsewhere than in the database. Interval between backups varies according the need. The plus side in backups and using DMS is that there is no need to backup users' computers as everything is stored on server(s). It is normal procedure that a company makes/runs backups every night for changed documents, and every month for the entire system. (Anttila 2001, 151)

2.2.9 Workflow management

Many document management systems also offer the possibility to manage the workflow of documents. In practice it means management of different stages of a document. It is presumed that all stages are done in the system and there is information in the system about every step. Example of different stages is commenting document, publishing document, distributing document and so on. As there is document management in use for these stages, users' e-mails are not loaded as much in handling and moving all the documents. As the document under work is stored whole time in the document management system and all the versions, changes and so on can be seen from there also. (Anttila 2001, 64)

Some functions in the workflow can be automated. For example, if it has been defined initially how a specific document shall be published. Then anyone who has been defined to be in charge of accepting the document can accept it and the document then becomes automatically published. It is possible that everything is manual so that author needs to decide to whom he/she sends the document for evaluation, comments or acceptance. Administrators can create rules

that dictate the flow of the document through the system and organization. For example an invoice passes the approval process and is then routed to accounts-payable department. Rules can be dynamic and allow branches in the workflow. For example a dynamic rule can be set according to how large the invoice amount is. If it is over a certain amount, the invoice is directed through a different route inside the organization than invoices under the amount.

2.3 Document management system architecture

Technical implementation differs between document management systems. Some systems are able to use multiple different implementations. For example DMS may offer both a web-interface and a traditional desktop interface.

2.3.1 Desktop software – file system

Simplest systems may consist of software installed to desktops and server, which has a database and file storage. In that kind of system, the advantage is simplicity and fast deployment. Usually this type of DMS uses open file structure. In this kind of architecture there are no applications running on server computer(s). Downside of this architecture is that it has big requirements for desktop operation system and hardware. In small companies administration of desktops is not that big a thing but in big environments it may become laborious. Same applies to database if there is only one and there is large amount of users and documents. Solution to that is dividing documents to multiple databases. This kind of architecture is not popular anymore. (Anttila 2001, 101-102)

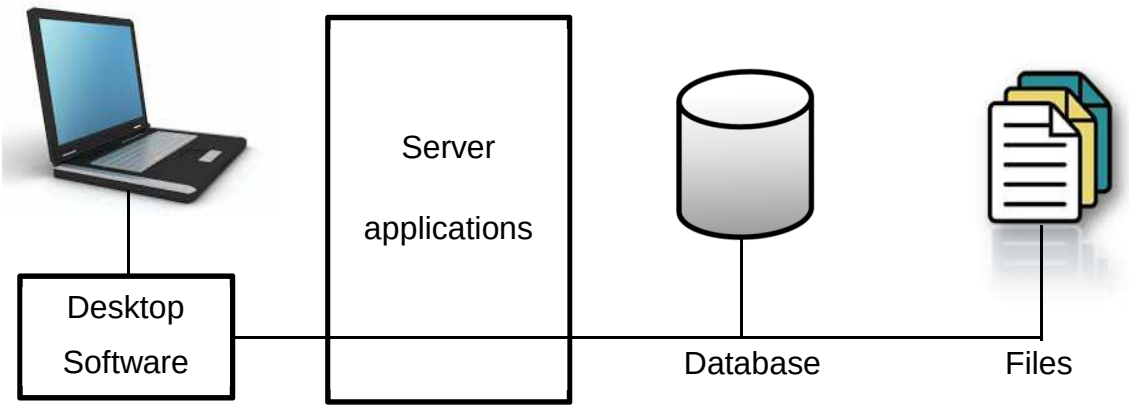

Figure 2: Desktop software – file system

2.3.2 Desktop software – database server – file server

A common way for document management systems is to use a so called client-server architecture. Client-server architecture is defined so that in network many clients request and receive service from a centralized server. Desktops (clients) provide an interface to allow the user to request services from the server and then display the results the server returns. This architecture may also be referred as a thick client. There are several applications running in the server. There is usually a separate application / service running for database, file storage and system administration. There may be also own applications running for producing presentation information and content indexing. (Anttila 2001, 102-103)

The advantage of this kind of architecture is scalability. Server application can be distributed to multiple servers. Security is also usually better on servers than if the information would be stored in desktops. Downside again is the must for installing applications on desktops and their administration. Also of course server application and database administration will burden the IT-staff. It also loses to peer to peer model as if one server fails, clients request will not be answered. (Khosrowpour 2000, 22)

For example OfficeGemeni is offering document management system based on this architecture called Dokmee. It uses this architecture for all sizes of installations. They offer home, professional and enterprise thick-client versions of their document management system. Also there is web-based solution by them, which architecture is elaborated in the next chapter. (Dokmee, 2015)

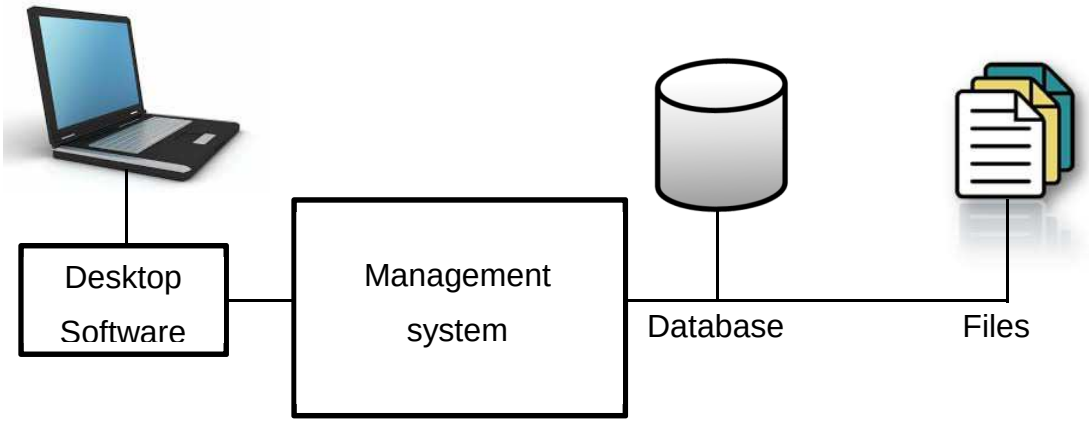

Figure 3: Desktop software – database server – file server

2.3.3 Internet browser – webserver

The amount of systems based on internet browser and webserver have been increasing in the document management field. There are systems that offer both a client – server architecture and the possibility to use the system with internet browser. The architecture is very much same as in client – server, but a webserver is also working on the server. With web based interface the administration of desktops is a lot easier, as there is no need for additional software to use the DMS. Web based interface also makes it simpler to use the document management system from outside of the company. It also strips away the operating system limitations. In systems that work only via internet browser some limitations in connectivity to other programs may exist due to the browser. For example M-Files document management solution is based on this architecture and is closely elaborated later in this thesis. (Anttila 2001, 103-104)

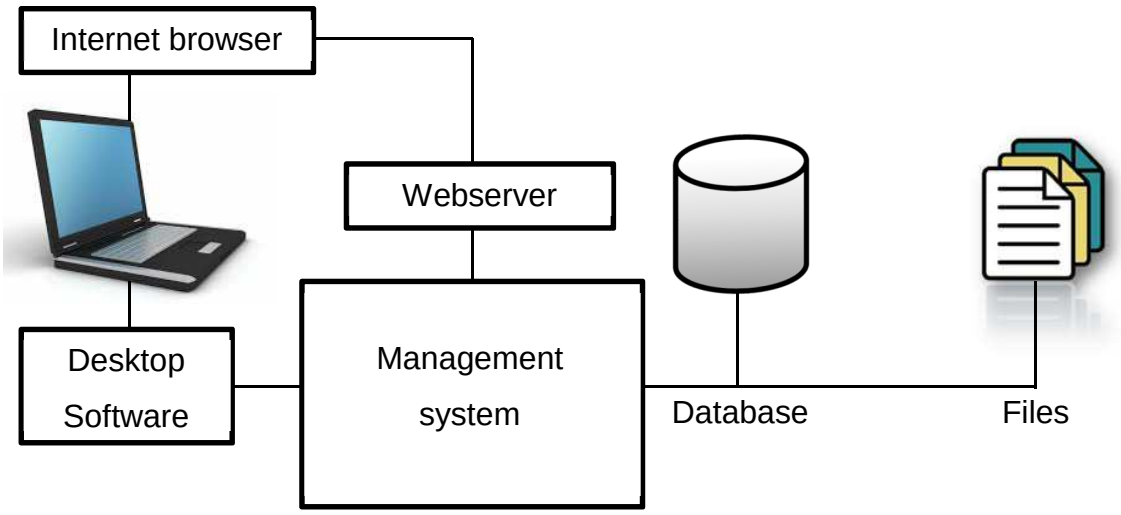

Figure 4: Internet browser - webserver

2.4 Document storage

In document management systems there always has to be place where the files are stored. There is always some sort of database in DMS for documents meta-data. It's common to have server in the network where the files are stored. It is also possible that there are more than one servers and that they are located in different locations. This, however, is not common for small companies. By distributing servers the traffic can also be distributed more evenly between networks. There are also different ways to save the files in the server(s). Most common ways are open file structure, closed file structure and database. (Anttila 2001, 97, 104-105)

2.4.1 Open file structure

The simplest method is open file structure. It uses normal folder structure, which can be seen by the users. Location of the document is saved to the database with other meta-data. This means that access rights are not defined by the document management system. Rights are inherited from the file systems access rights.

One of the biggest problems in this is the access rights as the rights to the document vary during its lifecycle and those rights are hard to control in this kind of file structure. However it is a viable solution when all the users have same rights in the system. The users are then usually divided to groups and groups have the access to their own files and so on. It can be used also when focusing on satisfying needs of users that just need to view the documents. This will greatly reduce the basic functions of document management system. (Anttila 2001, 97-98)

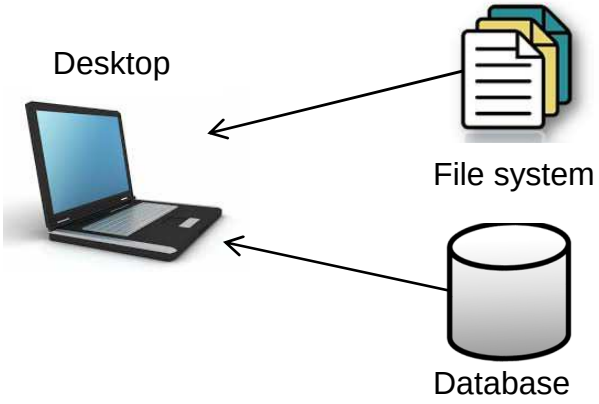

Figure 5: System with open file structure

2.4.2 Closed file structure

Many document management systems have a closed file structure. This means that users will not have direct access to the files. There is a management system running on the server, which has all rights to all files. It checks from the database whether a specific user has the rights to the file he/she has requested or not etc. Using a closed file structure also increases information security. Administration and access rights management is simplified greatly by closed file structure. File naming is also simpler to decide as there is no need to pay heed to systems own internal naming. (Anttila 2001, 98-99)

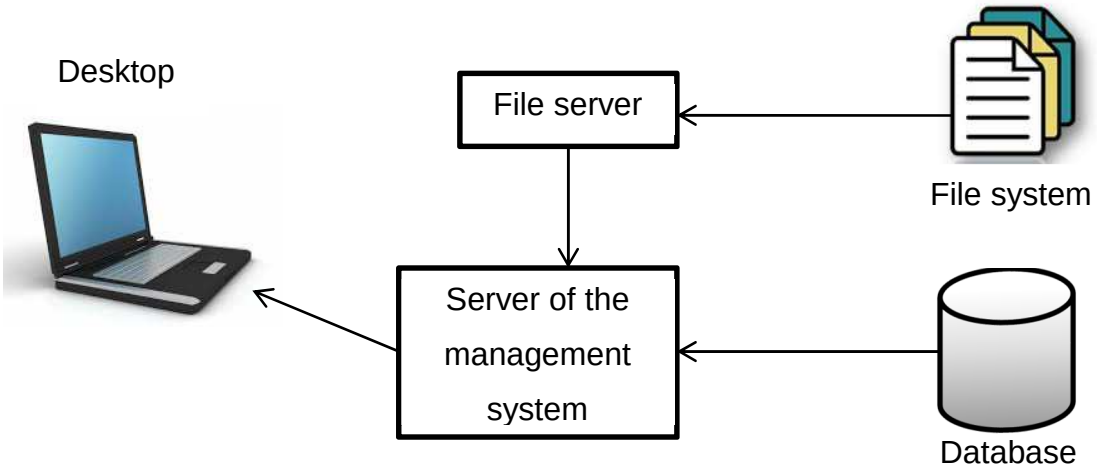

Figure 6: System with closed file structure

2.4.3 Database

Some document management systems also store the file content on the database. This type of systems does not require a file management application or file structure. The basic principle of using database for files is really simple. There is no need to care about file systems rights and information security is very high. This is because documents can be downloaded only via the administration application. Databases are usually also encrypted and therefore files are well protected. The down side in using database for this is that the files are saved in different format than the original format. This method suits best for text documents but not for massive 3d-models, videos or designs, which may easily increase the database size too big to control. (Anttila 2001, 100-101)

2.5 Document management without designed software

Document management without a dedicated software can be very difficult and laborious, but not impossible. It is based solely on folder structure and filenames. Problems arise when there is more than one user in this kind of system. Metadata can also be managed without software for it by storing it in the file properties or with New Technology File System proprietary file system's improved support for metadata. (Anttila 2001, 11-13)

Searching of the documents is still possible with operating systems own search functions. With it user can in most cases look for document with document name, folder name, created date, edited date, modified date, file type or file size. It is also possible look with meta-data by using containing text type searched. Many operating systems nowadays use indexing to speed up the searches. (Anttila 2001, 16-17)

Version control is tricky without software designed to do it or software with the possibility of doing it. Multiple persons using the same system or documents only increases the difficulties as then it is easy to make overlapping changes to the documents. Documents located in network prevent that by locking the file for editing but this does not help when user copies the file to own computer and during that time some makes changes to the document in network. It is also hard to manage document versions with only the document name. (Anttila 2001, 18)

2.6 Product data management

Product data management (PDM) often includes DMS or there is possibility to add DMS to PDM-system. However it is common to have separate document management system or that document management system is part of some other bigger system. (Väätäinen, 2002)

With PDM-systems its owners try to control and follow information created, changes and archive all product related information. PDM-systems serve as centralized data storage for all processes and product history. It has same goal as document management system as with it collaboration between people are enhanced. PDM-systems have more features than document management systems as with it users can control product data check-in / check-out rules, change management and bill of materials are built and edited with it. (Epicor, 2015)

It is the same with PDM-systems as with document management systems that originally users were designers and engineers but now users are divided to many different areas such as sales, marketing, finance, support and so on. This makes

it possible for user groups that are not involved in product development phases to utilize product data. (CAE DS, 2015, 2)

PDM-system is conventional for any company that designs or manufactures products. However, that is not a requirement to be able to get benefit from PDM-system. It is also true that almost any company in the world can benefit from DMS. As document management system can be for example network drive with specific folder structure where Pekka's LVI service saves their clients orders and other possible electronic material. (CAE DS, 2015, 3)

3 STAFF DOCUMENT MANAGEMENT SURVEY AND ANALYSIS

The main goal of this thesis work is to find out how the existing document management tools are used, what is the position of employees in relation to document management, and what are their user needs. In order to investigate these research questions a survey study was made.

Focus group in this survey was the entire company staff as AgentIT is a small company of 10 people. In this group of 10 people all work more or less in customer interface. Most of the staff are developers or integration specialists. Some also handle customer relations, acquire new customers, and do marketing and general administration and financial management. It was also decided that some interviews would complement the survey in a later phase of the document management system choosing process.

Survey research was executed right in the beginning to get a clear picture how document related things are and what is expected from the project. Later, the main users would be interviewed. The interview would include finding out which of the selected possible solutions would fit their needs the best and if there had been some major things missing in the selected solutions for document management system, which are needed and also to bring perspective to the selection progress.

3.1 Staff survey

Staff inquiry was done with an e-mail form. The question form can be found as attachment 1 in this thesis work. Out of 10 employees 8 answered to all questions. First category of questions included four questions about document management. Second category included 5 questions about documents that the staff

is currently producing and using during work. Last category was about how important does the staff see different document management system features. It was implemented with simple evaluation of how critical are listed features.

3.1.1 First category of questions

The first question considered whether the staff sees a need for document management, and do they see a benefit in centralized document management system. All saw benefit in document management system. One answer was maybe and other 5 were more positive about the possible positive effect of document management.

The second question was about what the staff regards as the most beneficial and as the most inconvenient thing in a document management system. Also here the answers were quite similar. As most beneficial things were seen:

- That documents would be located in centralized place and there would not be need for looking for documents from editors computer, network drive etc.
- There would be no need to disturb people during the holiday season or when they are away as needed background information could be found easily
- Search function was also mentioned
- Latest version of document would be easily found
- Less duplicate work

Following things were seen as possible drawbacks:

- If all are not using document management system or not updating documents after modifications
- If system is hard to use and its user is mandatory
- If system requires constant logging in
- If system is clumsy to use and how it can add workload in routine tasks

The third question was about what kind of needs the future user sees he/she has about the document management system. Future users expected to see a simple and easy to use solution for storing documents. It was also seen as important that the solution does not have operating system limitations and that the solution does not require the use of specific applications.

The fourth question figured out whether the staff has appetency or not and why about starting using centralized document management system. All answers were on the side of starting to use centralized document management system.

3.1.2 Summary of first category of questions

From answers to the first category of questions in the survey it can be determined that centralized document management system is something that staff welcomes with open arms. However, it has to be a system that does not increase work load and works smoothly over the internet in all possible operating systems. To this category there are two possible options: system that has web-access or system that is totally web based.

There is also the possibility for a third option that is network sharing, which would have access from outside company's network but it would require an organized and clear approach.

Also some features were highlighted already in the first category of questions. Those were: search feature, ease of use, and version control of documents.

3.1.3 Second category of questions

First question was how the employees manage documents at the moment. All had some sort of document management process. All were using folder structure to sort documents based on clients and projects. Some were using their own computers and network sharing and one employee was using Dropbox.

Second question enquired what kind of documents are created and related to work tasks. To this question the answers varied little bit more. Some did not produce documents at all but had specifications, instructions, guides, lists of commands and practices. However there were some producing meeting notes, contracts, offers, project plans, showcase materials, specifications, reports, economy charts and so on. Also storing source code was mentioned.

Third question was continuation for the second question and it was about what documents does the user think should be stored and shared. About half of the answerers though that everything should be stored and shared. The rest thought that only mapping documents, and documentation about changes should be shared.

Fourth question was about classification of the documents produced. There were some documents, which are classified but mainly not classified, at least inside the company.

Last question in this category was about what documents are needed daily and are they self-produced. Almost all needed different kinds of manuals daily and they were not self-produced. Most of the documents needed daily were not self-produced. Self-produced ones were project plans, to-do lists and spreadsheets.

3.1.4 Summary of second category of questions

From the second category of questions in the survey, it was learnt that all have some kind of way of handling documents already, so there would probably be some change resistance. Of course a lot depends on decisions made in the later phase, though there should not be made too big changes to already used folder structure or file naming logic etc. Those will need to be questioned again and depending on the document management system selected later those can be refined to complete part of the document management process.

It was also clear that there will be a need for user rights to prevent visibility of some documents, so some sort of user / access rights management feature

would be required from the document management system. No one expressed the need for sharing documents outside the company. However this will be asked again in later phase and how it would be best to implement.

3.1.5 Third category of questions

As mentioned before, the last category of questions was valuation of importance of different document management features. The valuation scale was 1-5. Numbers in order from 1 to 5 mean the following: no significance, little significance, relevant, important and vital condition. Selected features were basic features of document management and there was also possibility to add additional features. Additional features given by individuals were possibility to search with file type and code comments. Below is graph about the average of answers given.

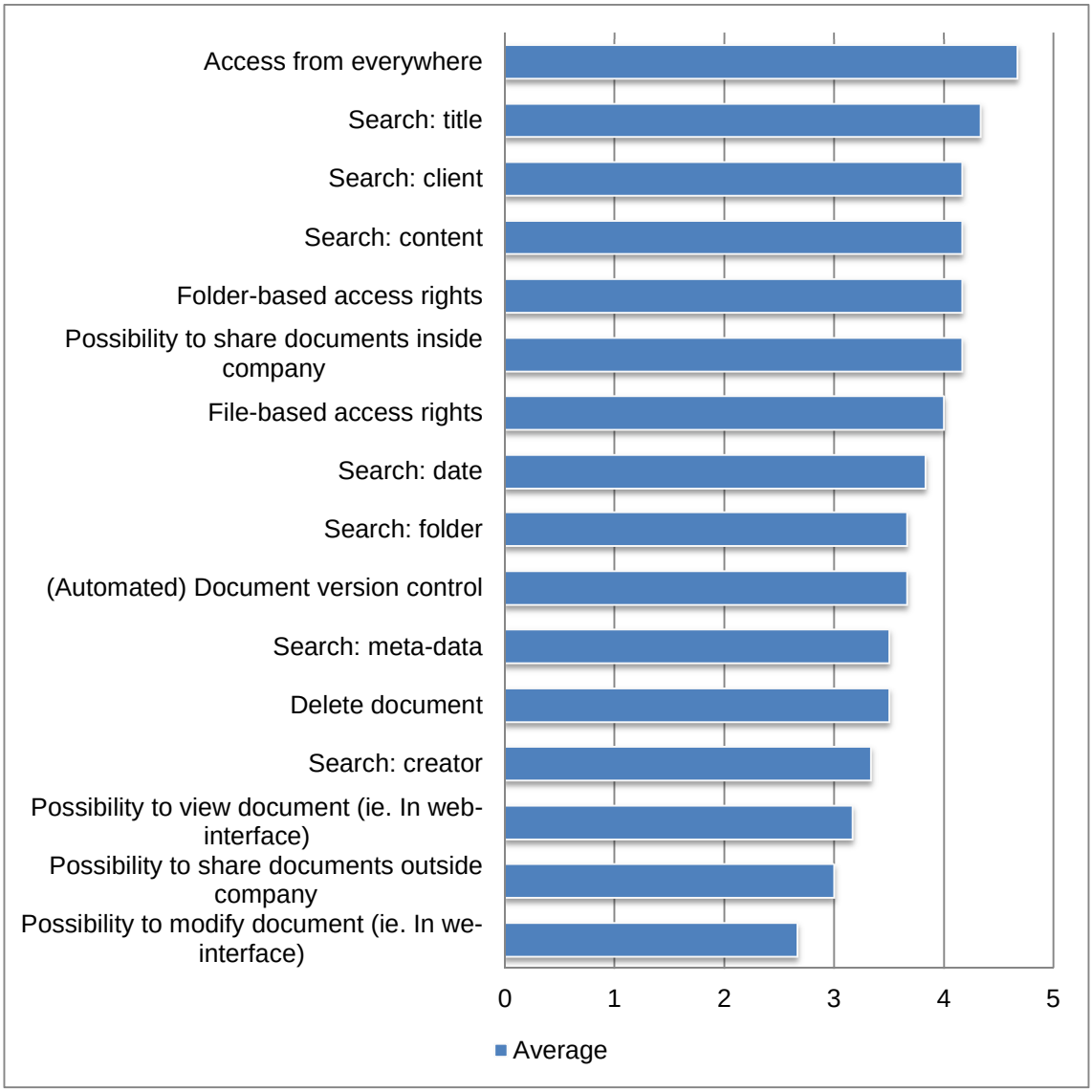

Figure 7: Average of valuations in answers to third category of questions.

3.1.6 Summary of third category of questions

Most vital feature, as excepted, was the access from anywhere, which means document management system should have web access possibility. Different search options were highly valued, too. As the most important search options were regarded the search with document title, client, and content. File access rights were not seen as important as folder based access-rights. Also sharing

inside company was seen more important than sharing documents outside company. Only one feature was seen it is not really relevant and that was modifying the document via DMS.

4 CURRENT STATUS AND PROCESS UPDATES

4.1 Systems analysis

According to the survey results, currently files are stored in Dropbox, NAS-drive, individual computers and in emails. Those four storage means form currently the data storage for “DMS”. For backups there is another NAS-drive, which is used for computer backups and as well for backing up NAS-drive used for document storing. For source code and source code version control BitBucket has been taken into use a few months ago. On top of these there are also other systems, which have and generate files to the DMS. Those systems are CRM and a purchase ledger.

User groups for the DMS would be employers, management, clients, partners (customer’s or collaborators). There is also a user group for billers and accounting company. Most of the documents and other files go between user groups via emails and the files are stored in one of the four data storages. Only group, which does not use email at the moment to send documents is billers, which sends bills to the purchase ledger. The results of the systems analysis and user groups of the current company’s document management system are illustrated in figure 8 below.

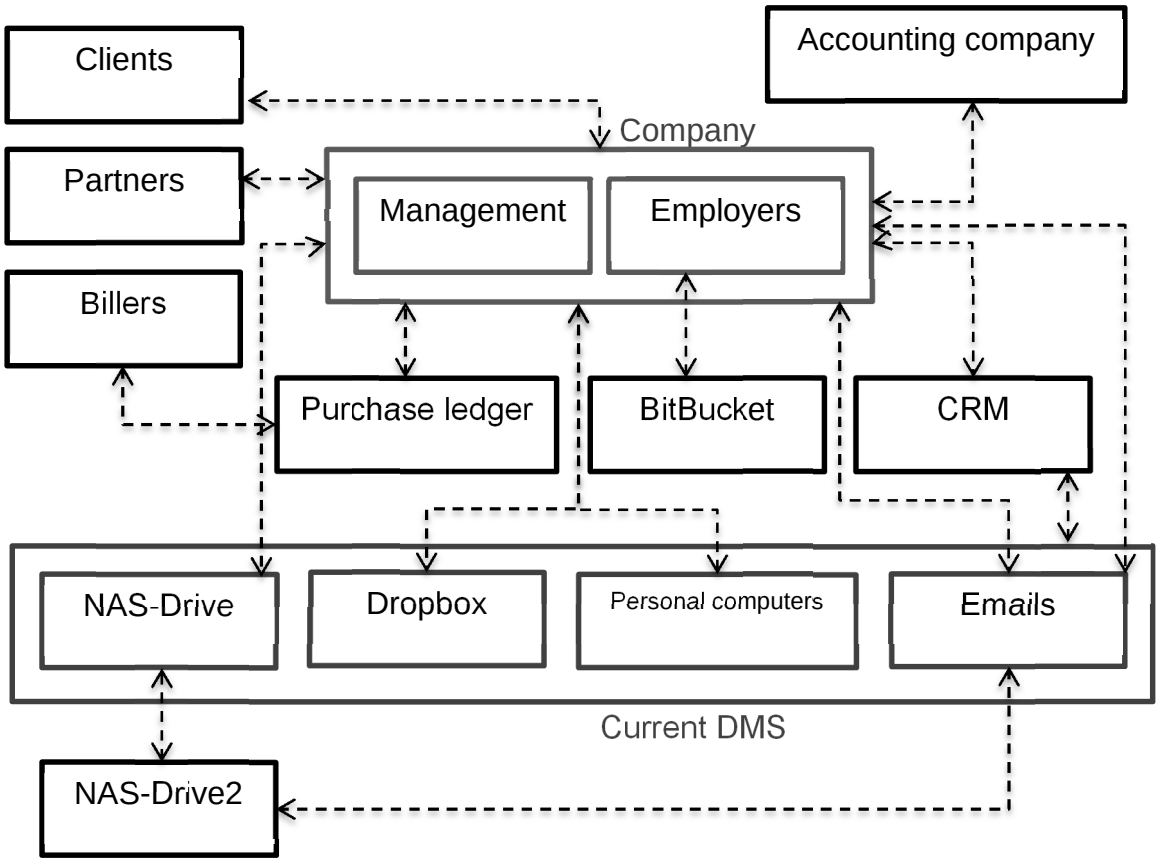

Figure 8: Systems analysis and user groups of the company's current DMS

4.2 Document management operating model and processes

Some of the current general processes regarding document management were taken under observation in order to find out how the process is now and how it could be made better with the possible new document management system. Processes taken under observation were: documents created outside of the company, documents created in-house, sharing documents inside of the company, sharing documents outside of the company and modifying documents stored. It is also recommended in JHS 173 that before doing requirement analysis there should exist an operating model and process courses about the system to be acquired. (JHS 173 ICT-palvelujen kehittäminen: Vaatimusmäärittely, 2015)

4.2.1 Operating model

In operating model level the company's function is described more accurate than in process map level. Process hierarchy is described in this level, which means main process of document management is split in to part processes. Operating model gives a full picture of the operation and binds processes together. It consists of operating chart and supplementary text descriptions. Below is operating model of document management system in this project. (JHS 152 Prosessien kuvaaminen, 2015)

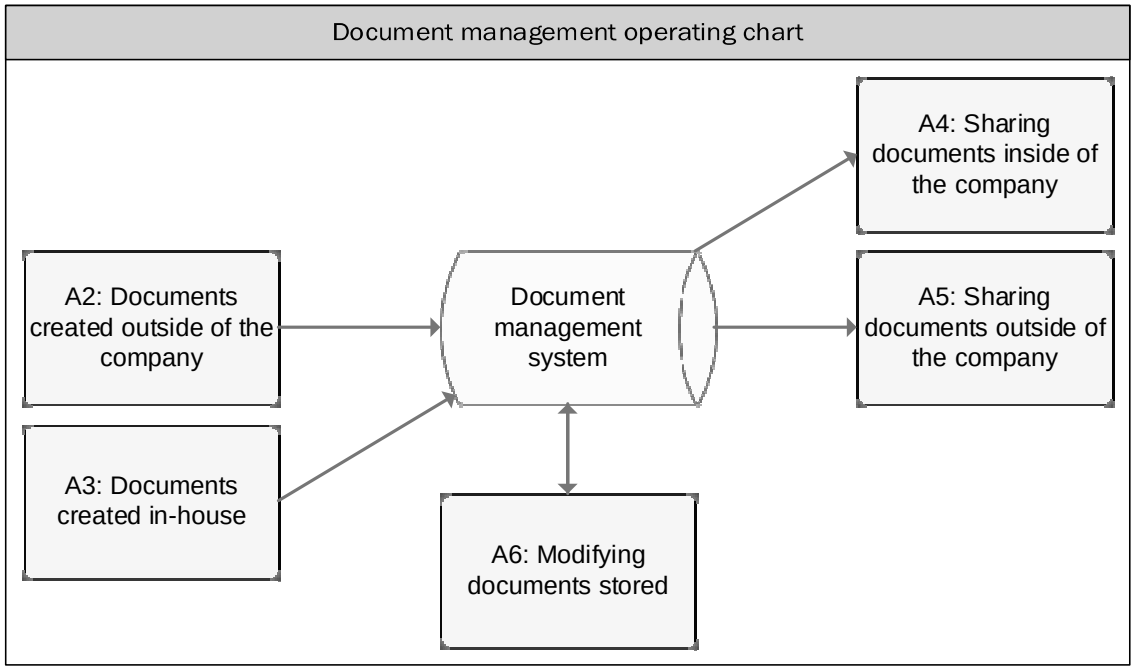

Figure 9: Document management operating chart

These operation model processes were established as key processes for document management in meeting with company's management. Process course were superficially gone through in the same meeting and later on mapped and accepted.

4.2.2 Process courses

On process course level a function is described in more detail than in operating model level. On this level process work stages, functions and responsibilities are described. Possible problems can be seen on this level more clearly. (JHS 152 Prosessien kuvaaminen, 2015)

A process is defined as an activity performed within or across organizations. Process is depicted as graph of Flow Objects in Business Process Modeling Notation. Business process can show more than one separate process. Processes may have their own sub-processes. (OMG Business Process Modeling Notation V1.1, 2015)

4.2.3 A2 Process: Documents created outside of the company

Original process for documents created outside the company did not exist before. Of course there were documents sent to the company and they were stored in different places. Those places were receiver's e-mail, NAS-drive, receiver's personal computer or Dropbox. The goal of the new process is that all the documents are located in the same place and can be more easily found when needed. It is also important that documents have correct access-rights and meta-data / description so searching is made easier even if it is done via the DMS search function.

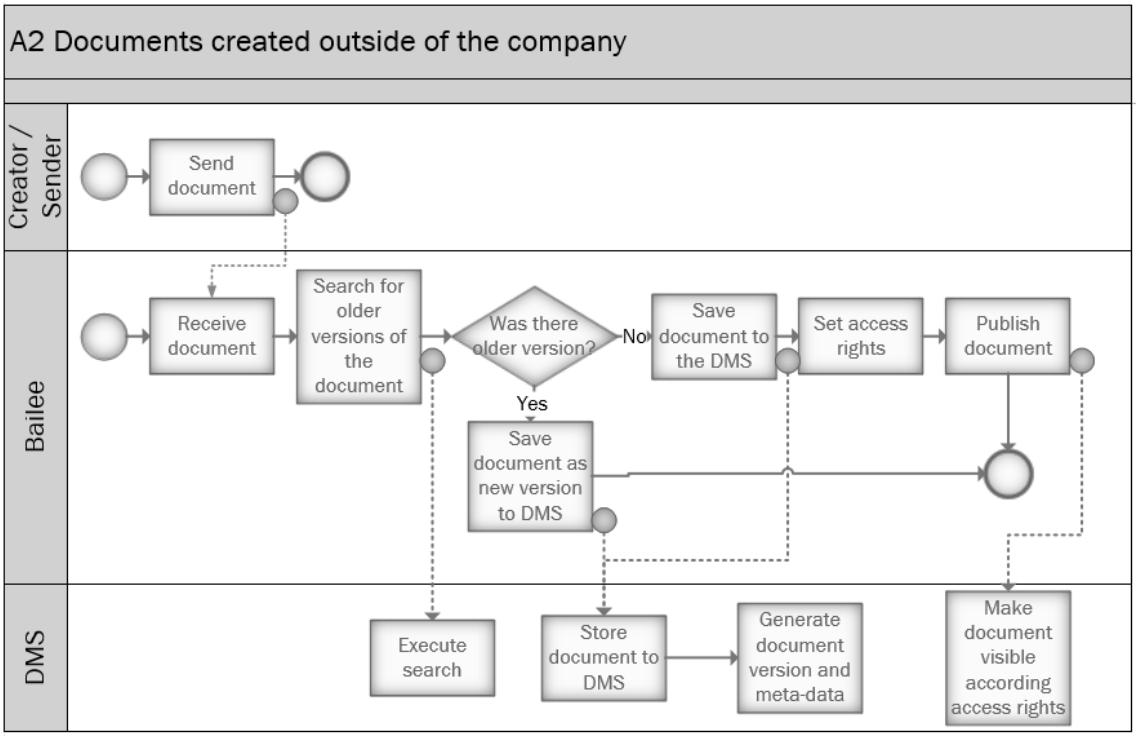

Figure 10: Process of documents created outside of the company

4.2.4 A3 Process: Documents created in-house

Original process for documents created in-house was that they were stored alternatively on creator's personal computer, NAS-drive or Dropbox. There was no version control defined although some after editing the document were versioning documents by adding modified date to document name and so on. Also there was no approval process, there is one now and also the version control will be handled by the document management system. Main point here is that documents will all be located in the same place and access can be limited by access-rights. It is also important that documents can be found more easily as they are located in the same place and with the help of good search function and meta-data or description of the document in the DMS. Below is the new process chart.

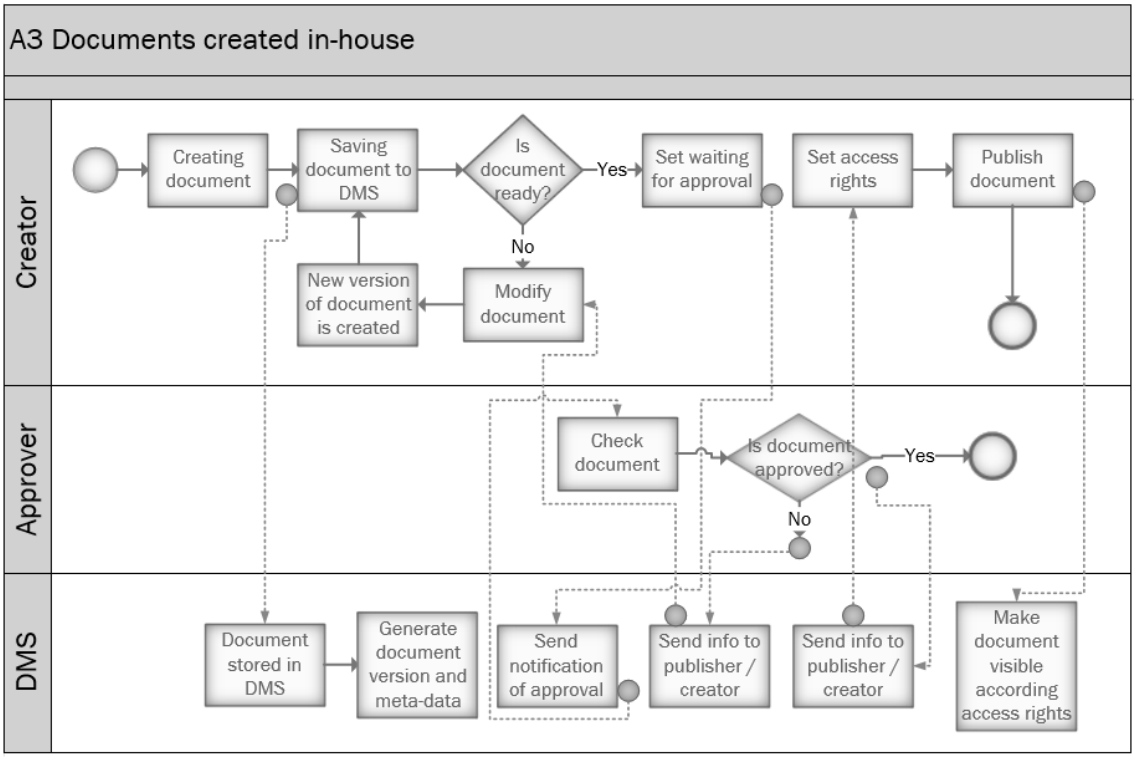

Figure 11: Process of documents created in-house

4.2.5 A4 Process: Sharing documents inside of the company

Sharing documents inside the company has also been handled in various ways, depending somewhat where the document was stored. However there has been times when a document has been sent via email to receiver regardless where the document has been stored. On the other hand when document has been stored for example in the NAS-drive, it has been said “you can get it from there” et cetera. With the new process the goal is that documents will be shared only via the DMS and because of that it will always be the correct version of the document that is shared. Also if the document will be modified by the receiver it can be saved as a new version or totally separate document again back to the document management system. Below is now process chart of the process A4.

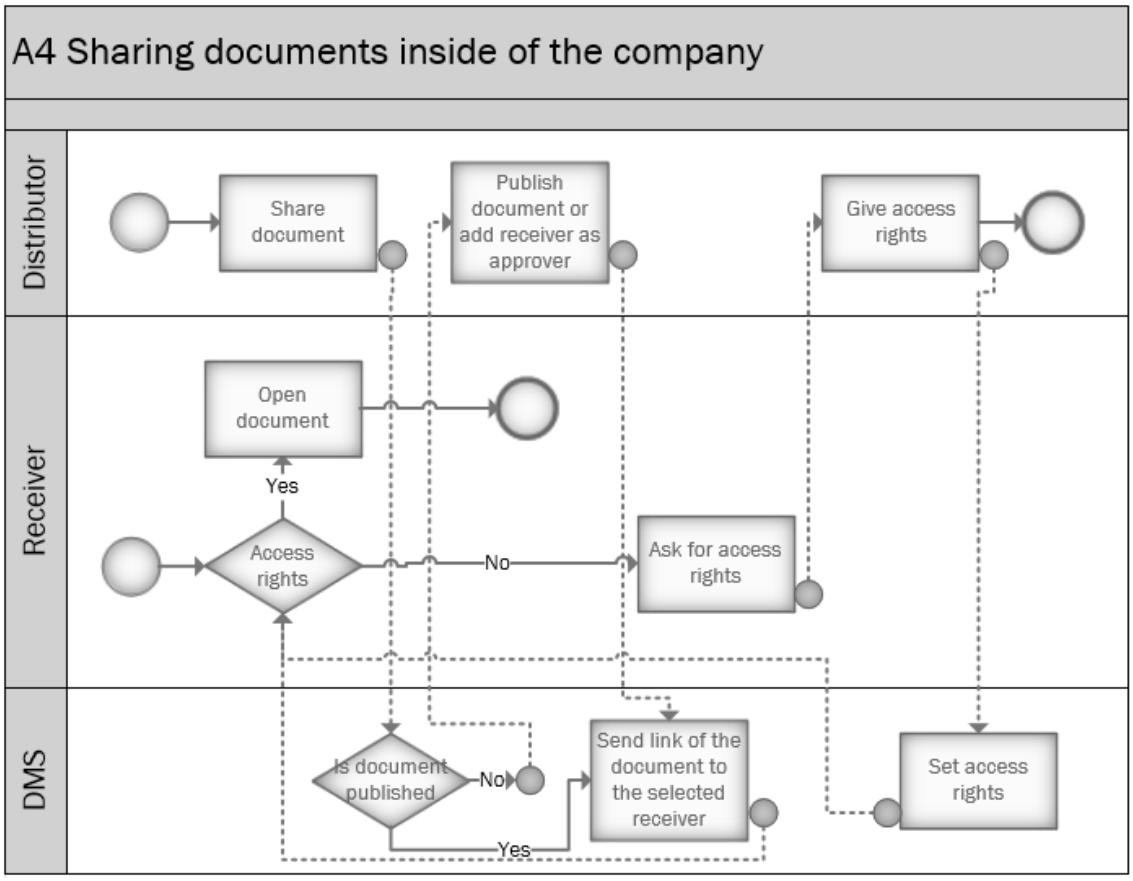

Figure 12: Process of sharing documents inside the company

4.2.6 A5 Process: Sharing documents outside the company

Documents shared outside the company process will depend on what kind of document management system will be selected and what features will it have. If it has for example guest user or possibility to give temporary link to download files receiver may get the file via that. Otherwise document will be sent via email as it has been done before. If receiver updates or comments on the document and there are changes done to the document the document will be stored back to DMS with A2 or A3 process.

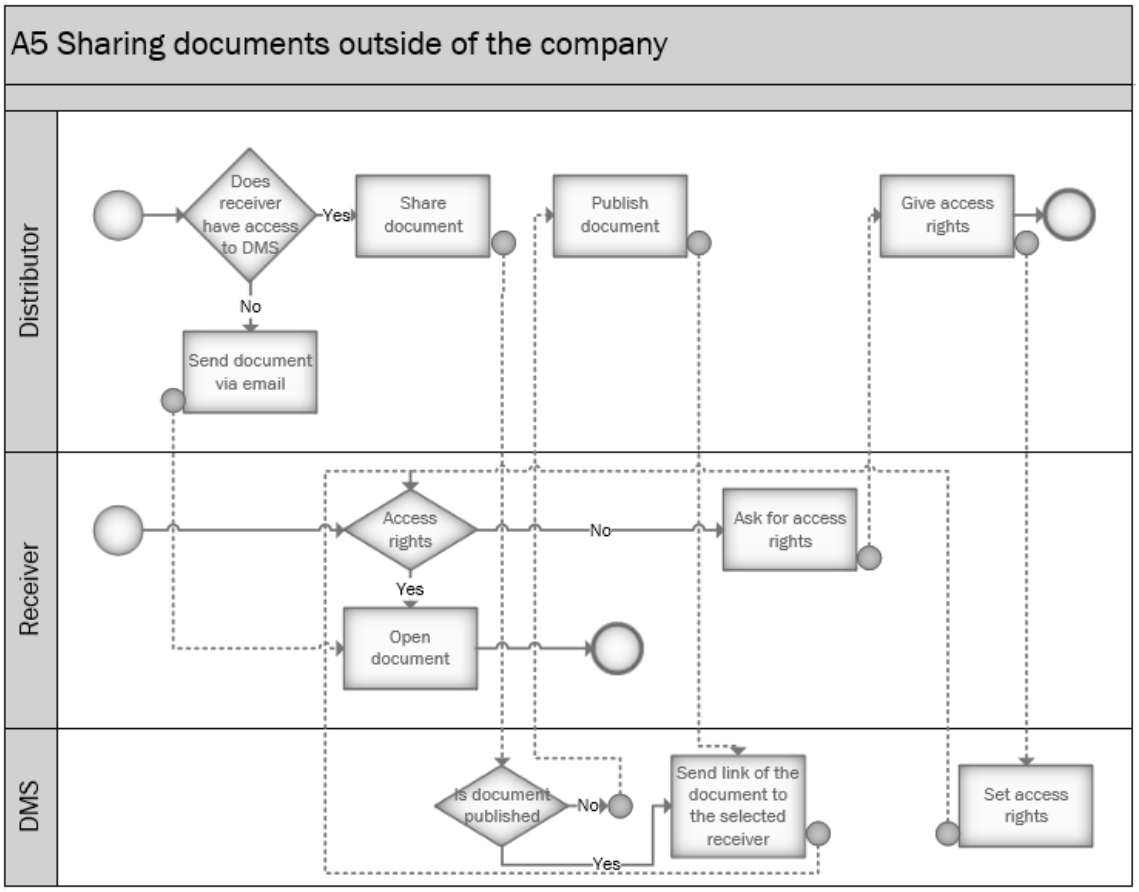

Figure 13: Process of sharing documents outside of the company

4.2.7 A6 Process: Modifying documents stored

Modifying documents requires checking-out document for editing so that there will not be two versions of document. Otherwise it is quite a simple process as document management system handles version control of the document and possible new meta-data will be generated. At this point generating meta-data means that it will be put in by the user when uploading the document. Process chart of modifying documents stored can be found below.

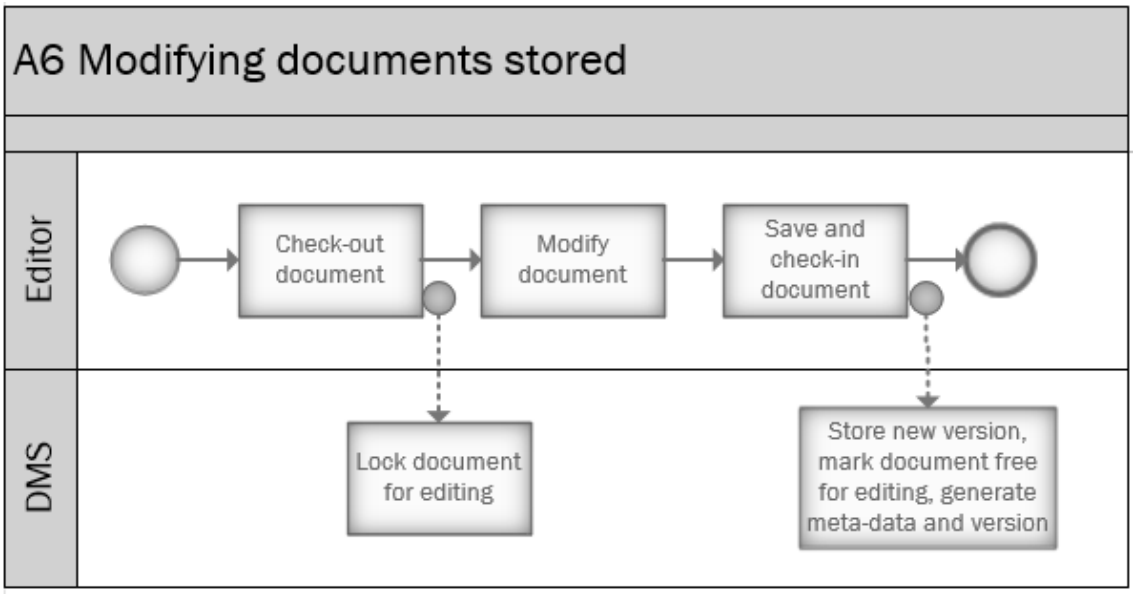

Figure 14: Process of modifying documents stored

5 REQUIREMENTS ANALYSIS

Requirements analysis and control is a systematic procedure to confirm that system under purchase meets all requirements set for it. Inadequate requirement analysis is common reason for IT projects to fail. There can be multiple reasons for that. For example requirement collectors and actual users do not understand each other, actual end user is different than purchaser of the system and purchaser's view may differ from the actual end user's view. (JHS 173 ICT-palvelujen kehittäminen: Vaatimusmäärittely, 2015)

The requirements can be divided to 3 different groups, which are user requirements, systems functional and non-functional requirements and business requirements. The depth of requirement analysis differs according to the system acquired. Requirements are conveyed from upper level of requirements to lower level. (Bourque P. and Fairley R. 2004, 38)

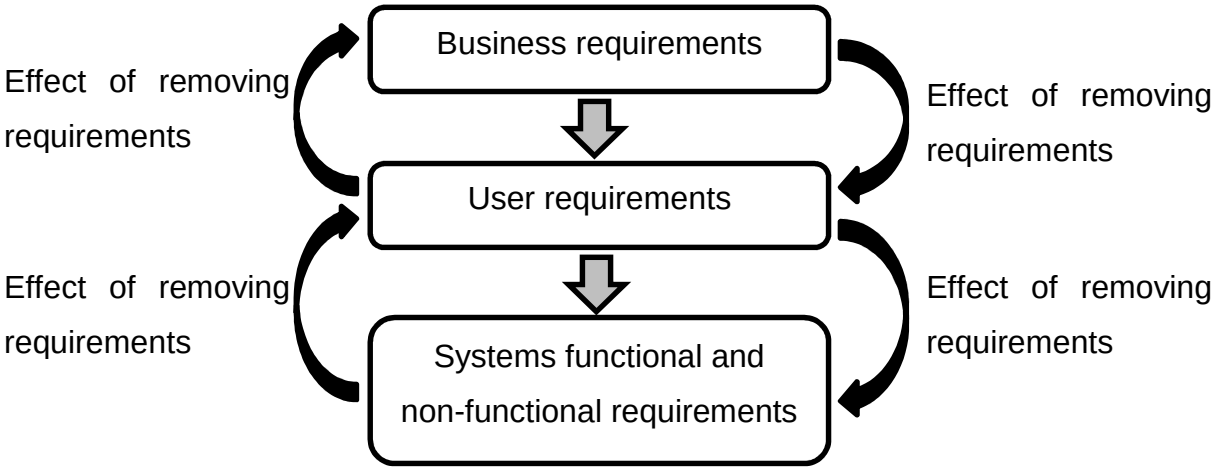

Figure 15: Requirement groups and hierarchy between groups

Business requirements are high level goals, which organization tries to achieve with the help of the system. User requirements reflect actions that users must be able to do using the system. User requirements can also be called as identifying needs, where problems of current state are evaluated. Systems functional requirements define the functionality of the system. Whereas non-functional requirements define the requirements set for systems operation of the non-binding

functionalities requirements. Non-functional requirements can be related in example to security, usability and so on. Future needs must be clear when defining the requirements. (JHS 173 ICT-palvelujen kehittäminen: Vaatimusmäärittely, 2015)

The requirement priority should be taken into consideration also when doing requirement analysis and when judging the results of it. The higher the priority is, the more important the requirement is when meeting the goals of the software. Common scaling for priority of requirement analysis are the following: mandatory, highly desirable, desirable, optional. Priority is balanced against possible cost. (Bourque P. and Fairley R. 2004, 39)

Characteristics of good requirements are correct, unambiguous, complete, consistent, ranked for importance and/or stability, verifiable, modifiable and traceable. These characteristics may vary depending on the writer as each writer is emphasizing the characteristics most suited to that discussion specific technology domain. Before mentioned good characteristics are generally acknowledged. (IEEE Recommended Practice for Software Requirements Specifications, 2015, 10)

5.1 Requirement analysis of the document management system

The document management system selected should have the functions needed included, and it should be reasonable to acquire. The company wants a system that fulfills their needs without additional customizations. As the system will be an out of the box solution it means that the requirement analysis will not be as deep or vast as it would be with customized document management system. (JHS 173 ICT-palvelujen kehittäminen: Vaatimusmäärittely, 2015)

Requirements were gathered based on original project goals and staff survey. Requirements were reviewed together with client of the document management project. Requirements were accepted and small adjustments were done in mutual agreement. Below is table of the requirements categorized in groups presented above and also prioritized.

Table 3: Requirements

Priority	Requirement
	Business requirements
Highly desirable	Documents should be better accessible and organized
Mandatory	There should be same document management process for the entire company
Mandatory	> There should be centralized place to store documents
Desirable	Documents related things should take less time / be more cost-effective
Highly desirable	> There should be less duplicate work
Highly desirable	Documents should be more secure
Mandatory	Documents should not be lost
Mandatory	Easily affordable or possible to host on own company's own server without big purchases
	User requirements
Mandatory	There should be possibility to store documents
Mandatory	There should be possibility to retrieve documents
Mandatory	There should be possibility to share documents
	(these are more accurately explained in new processes)
	Functional requirements
Highly desirable	There should be version control for documents
Desirable	There should be folder structure for files
Mandatory	There should be meta-data in files
Mandatory	> category, sub-category, description etc.
Mandatory	There should be access-rights based on files or folder rights
Desirable	There should be possibility to share documents to outside of the company
Highly desirable	There should be different stages for files: draft, under evaluation, approved, published
Mandatory	There should be search function with following options: full text (content), meta-data, client, created date, modified date, folder, creator, title
Desirable	There should be automated backup
Highly desirable	Functionality of the system should be fast
Mandatory	System should be accessible from anywhere
Desirable	System should be simple and easy to use
	Non-functional requirements
Mandatory	There should not be operating system dependence
Highly desirable	There should not be need for installed applications

6 DOCUMENT MANAGEMENT SYSTEM MAPPING

At the beginning of mapping the suitable document management systems it was decided to focus on systems that solely function as document management systems and are clear, easy to use and are easily affordable or that there is possibility to host it on company's own server without big purchases. Because of this, large scale systems, like Sharepoint and Alfresco, were ruled out and were not included. For closer analysis the following document management systems were selected: OpenDocMan, SeedDMS, LogicalDOC and M-Files.

6.1 M-Files

M-Files is a document management system developed by Motive Systems Oy. M-Files integrates as part of Windows Explore so it is easy to use as it offers users already known interface. It is also possible to use M-files via web browser. It also has own applications for iOS, Android and Windows Phones. (M-Files, 2015)

Of the selected documents management systems M-Files is the only one which does not offer a so-called community version of their DMS. However, there is a possibility to download and tryout a 30-day demo version of M-Files. M-files is using system described earlier and can be seen in Figure 4. Some of its functions rely on the software installed on user desktops so all features will not be available when using M-Files via internet browser. (M-Files, 2015)

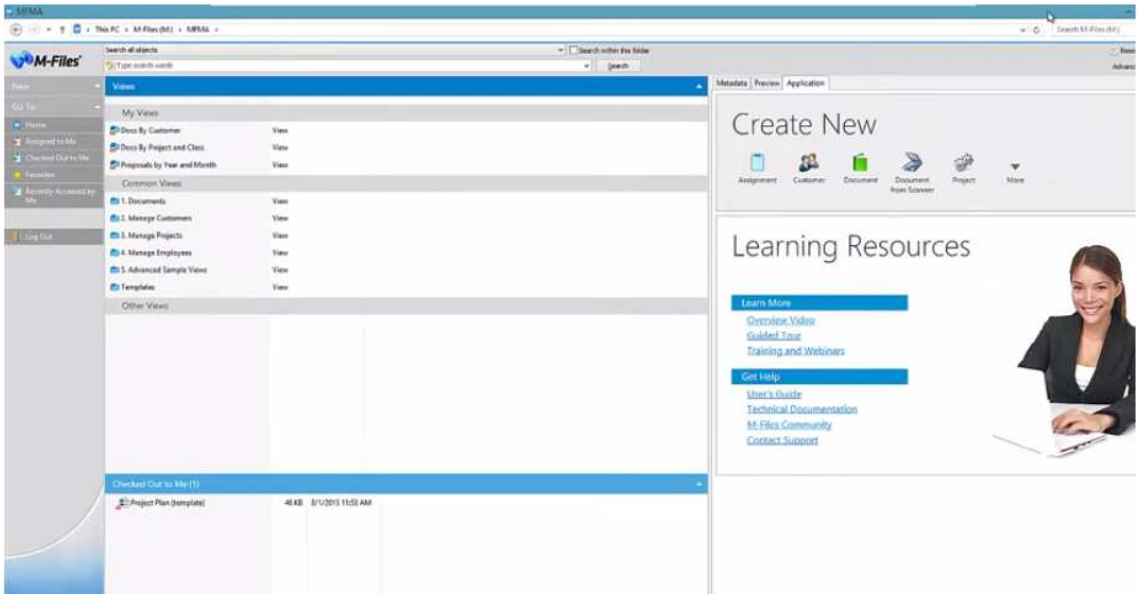

Figure 16: Starting view of M-Files

6.1.1 Document management with M-Files

M-Files is developed for document management. As mentioned before, it is easy to take in use as users do not need to change their working patterns that much. Document storage of M-Files can be accessed via the integration in Windows Explorer. In the document storage files are browsed instead of common folder structure with view created according document's meta-data. Users can create customs views and also search documents with search function. (M-Files, 2015)

M-Files is also compatible with all Windows applications, therefore the users can save files straight from the applications to a drive M-Files has created. After saving document to the drive user can insert meta-data information of the documents. M-Files currently supports 24 languages, up to date list can be seen on their website. (M-Files, 2015)

As mentioned before, the document storage of M-Files can be accessed also via a web interface. The web interface is identical to the M-Files drive user interface but it does not have preview possibility. When using web browser to use M-Files, there is no need to install anything to the computer. That makes M-Files usable in other operating systems as well. M-Files has an offline-mode. The offline-mode

of course is only available when using M-Files application installed to Windows computer. When in offline-mode, the user can use all the files, which have been marked as available in offline-mode. (M-Files, 2015)

M-Files can be installed on buyer organization own servers. M-Files also offers cloud based document management. The plus side in this is smaller starting investments or extra recourses needed to assist the solution. There is also M-Files Cloud Vault service, which offers extra copies and automatic third party back-up copying. (M-Files, 2015)

There are three different types of licenses for M-Files, which are user license, concerted user license and only read-rights license. As mentioned before there are two different purchase models. In on-premise option M-Files licenses are bought by the company installing M-Files on their own servers, which is opposite of when using cloud vault option when company pays for so called usage fee per month of every license. M-Files offers different trainings for its customers. There are user trainings, business administrator trainings, IT administrator trainings and system architect trainings. They also have e-learning environment where trainees can certificate their skills. Trainings are offered in English and in Finnish on their website. (M-Files, 2015)

M-Files uses an embedded SQL database engine. Embedded engine is called Firebird, in addition to Firebird users can use Microsoft SQL Server. Changing from Firebird to Microsoft SQL Server is possible if needed later, however vise versa it is not possible. M-Files optimizes database automatically once a week and it supports timed full and change based backups. For backups M-Files admintool can be used when using Firebird database and if using Microsoft SQL Server any backup systems compatible with Microsoft SQL Server can be used. The M-Files Server software runs on a Windows computer only. However it is possible to use in example Linux Samba share to store the file data of M-Files document vaults. (M-Files, 2015)

6.2 SeedDMS

“SeedDMS is the continuation of LetoDMS because it has lost its main developer. SeedDMS is an easy to use but powerful Open Source Document Management System based on PHP and MySQL or sqlite3. Many years of development has made it a mature and enterprise ready platform for sharing and storing documets. It’s fully compatible with LETODMS.” (SeedDMS, 2015)

SeedDMS has live demo accessible via their own website. SeedDMS has fully web based user interface and is purely internet browser – webserver system. SeedDMS has separate mobile version but normal version is also usable with smartphones. (SeedDMS, 2015)

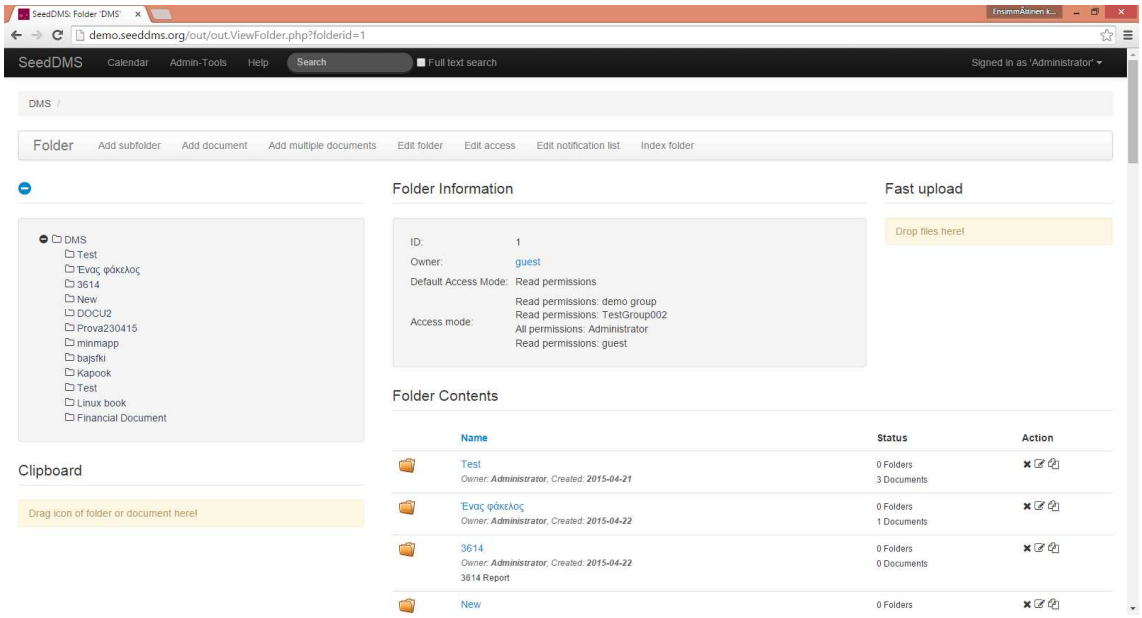

Figure 17: Home view of SeedDMS

6.2.1 Document management with SeedDMS

SeedDMS preserves former document versions so it has version control. SeedDMS can manage documents and folders to similar way as file system handles them on hard disk. It offers the possibility to add additional meta-data like keywords, description, the author and volitional attributes. (SeedDMS, 2015)

In SeedDMS documents can be linked to other documents or have documents as attachments. It also has file-based access rights and can have workflow, which can be run before published. SeedDMS has simple workflow management for requesting review and approval before publishing a document. It also has workflow engine, which makes it possible to make user defined workflows. (SeedDMS, 2015)

There is also a fast upload option of documents with drag and drop feature. The common document types like MS Word, MS, Excel and PDF can be indexed for full text search. For database search SeedDMS users can search with word(s) and define from where to search from (keywords, name, comment, attributes). Users can also define owner whose file to search, folder from where to search, time frame of when file was created. For documents users can define which state should the document be in, document number, document owner and when the document expires. (SeedDMS, 2015)

SeedDMS has its own Admin-Tools, which include users management, groups management, backup tool, log files management, global keywords, categories, creating fulltext index, contents overview, charts, general settings and so on. With backup tools document management system admin users can create versioning file and archive. Archive contains the files of entire DMS. In example in charts page administrators can get useful information about the usage of the document management system. There are charts of documents per user, diskspace per user, documents per mime-type, documents per category, documents per status, new documents per month and number of documents. (SeedDMS, 2015)

Taking SeedDMS into use will require some technical skills as it can be downloaded in packages from the sourceforge and comes with little instructions how to install it on company's own web server. There are older versions of SeedDMS available for download as well the newest pre-release. However there is also a German company MMK GmbH, which offers support for SeedDMS, possibility to customize SeedDMS to different needs and hosting. Their website is in German but English can be used for communication. (SeedDMS, 2015)

6.3 LogicalDOC

LogicalDOC advertises itself as high-performance, intuitive document management system. Their solution enables possibility to create, co-author and coordinate any number of documents. LogicalDOC can be used via web interface and is also internet browser – webserver system but it has mobile app for iOS and Android smartphones and tablets. There is also simple integration to Microsoft Office and Outlook and automatic import from computers shared folders. (LogicalDOC, 2015)

There are different versions of LogicalDOC available. They have community edition, which is free to use under the GNU Lesser General Public License (LGPL) version 2. There are installation instructions of LogicalDOC CE available and server side has to have Java JDK 1.7 and LogicalDOC itself comes in a bundle with Tomcat. Application server can be run on Windows, Linux or Mac OS X. As client is web based it can be used basicly in any operating system. Supported browsers are Firefox 15+, Internet Explorer 9+, Google Chrome 8+ and Safari 5+. LogicalDOC CE comes without support. (LogicalDOC, 2015)

There are also LogicalDOC Enterprise & Cloud and LogicalDOC Business versions available. Enterprice & Cloud version has all the features, Business is stripped version of that and CE has only standard features. As company already has some documents in Dropbox it is interesting that LogicalDOC all version have so called DropBox integration, which can be used to import and export files and folders from DrobBox. (LogicalDOC, 2015)

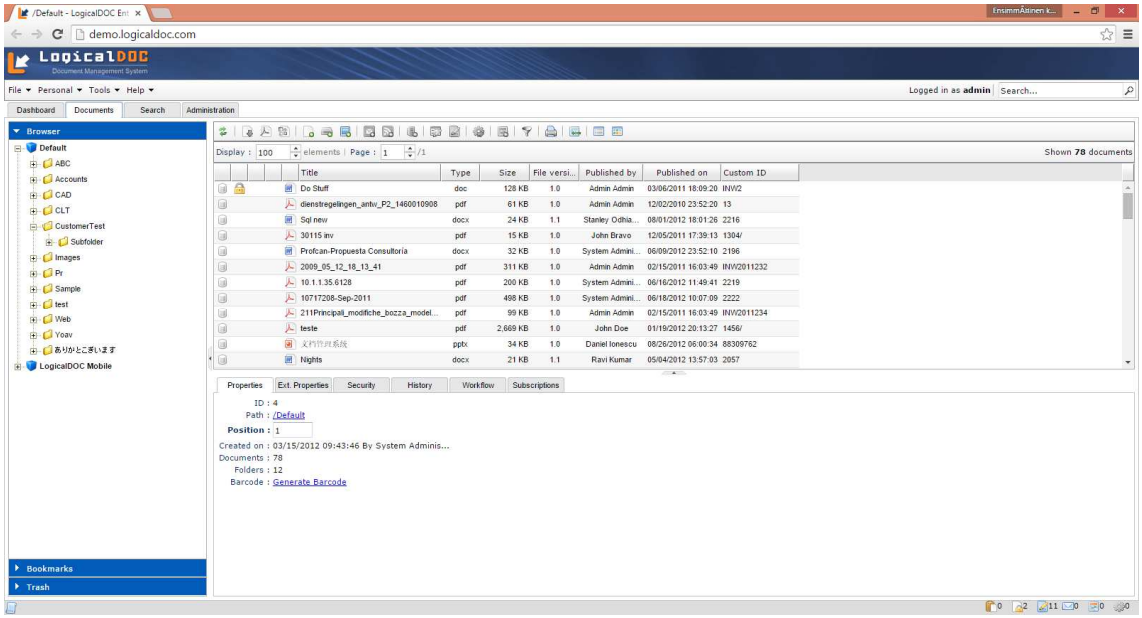

Figure 18: Document view of LogicalDOC Cloud

6.3.1 Document management with LogicalDOC

All versions of LogicalDOC have full-text indexing, metadata, version control, document searching, bookmarking, multi-language support, import from zip files, check-in & check-out, annotations, send as email or download ticket, statistic panel, tark manager, user and group access rights features, which covers all the company's basic needs. (LogicalDOC, 2015)

With full-text indexing it can provide instant search results based on the content of files and metadata stored in the DMS. Full-text indexing is asynchronous and scheduling policy can be configured. LogicalDOC's indexing supports Microsoft Office, Open Office, PDF and some other formats. All documents provide default properties such as subject, coverage, dates, author and in addition users can define own templates in order to add all the customs properties needed. (LogicalDOC, 2015)

LogicalDOC has a quick search, with full-text document searches on content or of any selection of metadata returns immediate results. Import from ZIP archives is important feature as it helps getting already stored date from current DMS to

the new one. It has also basic check-in and check-out feature. Users can lock / unlock, minor or major version specification on each check-in, users see which documents are checked out and by whom, read only of file when file is locked, all checking operations are logged and tracked also administrator can force the unlock of document check-in status. (LogicalDOC, 2015)

LogicalDOC also has a feature that enables sharing files to outside of the company. With it users can send documents via email by clicking menu item and selected documents will be sent to recipients. There is no need to add recipients as LogicalDOC users just email address is enough. If documents are too big to send with email users can also use option to send the documents as download ticket. When that is selected recipients will receive email containing download link they may use to download the documents straight from documents management system. (LogicalDOC, 2015)

6.4 OpenDocMan

OpenDocMan is open source document management system, so it is free to use. It is also as SeedDMS purely internet browser – webserver system. OpenDocMan is written in PHP and designed to comply with ISO 17025 and OIE standard for document management. (OpenDocMan, 2015)

There are 2 different versions of DocMan. OpenDocMan is the open source and free version. SecureDocMan is priced according features, with each upgrade buyer will get more storage and data for files and more features. There are four versions of SecureDocMan, which are basic, starter, pro and enterprice. Basic idea is that with OpenDocMan user install, hosts and supports the document management system himself. With SecureDocMan user gets to turn the key and then document management system is ready to use. (OpenDocMan, 2015)

All SecureDocMans have free 30-Day trial available and there is also demo of OpenDocMan, which users can tryout as admin or regular user. Server of OpenDocMan is not operating system dependent. It runs inside any PHP5-enabled

web server, such as IIS, Apache2 and so on. It has support for multiple languages but not for Finnish. (OpenDocMan, 2015)

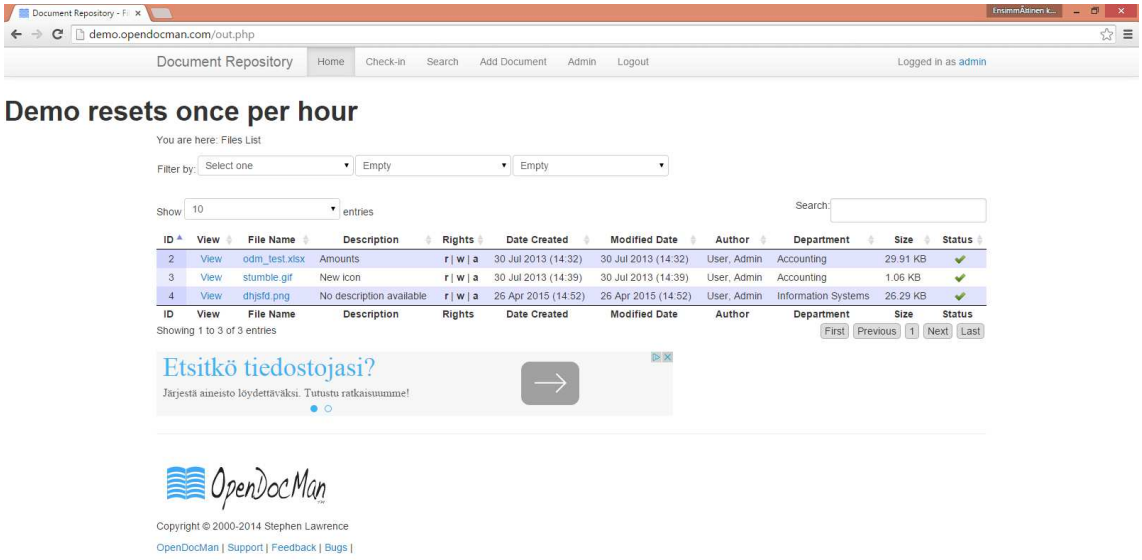

Figure 19: OpenDocMan Home-view

6.4.1 Document management with OpenDocMan

A workflow is available in OpenDocMan. It has automated document review process. There are 2 search features quick and full search. With quick search user can search by department, category or author and with full search by meat-data, department, category, author, file name, comments and so on. (OpenDocMan, 2015)

OpenDocMan has no limitation for file types so users can add any file type to the system. There are meta-data fields for each file and users can assign department and/or category to each file. There is also revision history and documents are stored physically on the server. Documents can be checked out to prevent overwriting of edits. It is also possible to create custom document properties to match user company's needs. (OpenDocMan, 2015)

There can be 3 types of users which are user, admin and super-admin. File access can be controlled for every file separately. There is no own back-up system but as files are stored physically on the server it is possible to back those files up.

6.5 Comparison

All systems mapped have multiple good and important features, which are beneficial and required by client. As the goal is to find a simple, clear, easy to use and easily affordable or that there is possibility to host it on company's own server without big purchases to comparison from each document management system the so called community edition was chosen except for M-Files, which does not have one. All four have closed file structure. The following table compares selected document management systems according the most important requirements. Complete comparison can be seen as Attachment 2 of this thesis.

Table 4: Document management systems comparison

	M-Files	SeedDMS	Logi-calDOC	OpenDocMan
Accessible anywhere	Yes	Yes	Yes	Yes
Client OS (supported)	Any (Windows users have extra features with installable software, office integration etc.)	Any	Any	Any
***web-access**	Yes	Yes	Yes	Yes
Hostable server	Yes	Yes	Yes	Yes

***hosting service**	Available for fixed price	Available for fixed price	Available for fixed price	Available for Secure-DocMan
Access-rights	Yes, users and groups	Yes, users and groups	Yes, users and groups	Yes, users and groups
***file**	Yes	Yes	Yes	Yes
***folder**	Yes	Yes	Yes	Yes
Version control	Yes, old versions can be restored	Yes, change	Yes	Yes
Import	Files and folders	No	ZIP archives	No
Search	Yes	Yes	Yes	Yes
***Indexing**	Yes	Yes	Yes	No
***with meta-data**	Yes	Yes	Yes	Yes
***with content**	Yes	Yes	Yes	No
Sharing files for users without access/account to DMS	Yes, email from DMS	No	Yes, email or download link from DMS	No
Backup	Yes	Yes	Yes	Not included in DMS
Folder structure	No	Yes	Yes	No
Workflow	Yes	Yes	Yes	Yes
***approval/review**	Yes	Yes	Yes	Yes
***customizable**	Yes	Yes	Yes	No
File stages	Yes	Yes	Yes	Yes

6.6 Selection

LogicalDOC community edition was chosen as company's forthcoming document management system. It fills all the requirements set for the document management system. It was also the only one of the selected ones which is capable of sending download link of document to nonuser when sharing documents outside of the company.

Even with the community edition of LogicalDOC client can move desired documents from current storages easily. As there is possibility to import ZIP archives, which can be used to import documents from network drive and there is also integration with Dropbox to export and import documents and folders between both Dropbox and LogicalDOC.

Otherwise all four document management systems were close on par with each other. There were small variations in terms of ease of use and offering eye candy. OpenDocMan was missing most of the required features but was really simple and had a robust feel. SeedDMS had almost all features required and offered a very user friendly interface. However its support and sites were somewhat lacking when comparing to other two: M-Files and LogicalDOC. M-Files probably had most features at least when comparing to community edition of LogicalDOC but it was missing some important ones. Also it was more focused on Windows desktops when client wanted solution, which is suitable and same for all operating systems. Therefore the project will continue with LogicalDOC.

7 SUMMARY

7.1 Conclusion

As outcome from the thesis, the company received clearly defined processes for basic document management operations, mapping of requirements and selection of best fit document management system based on the mapping and comparison of document management systems.

There are several things affecting the selection. Depending on company's needs, possible investment and already existing assets (server(s), hosting, and so on) the selection made here may not be applicable for other companies. However, the outcome of the thesis may help others to use a similar process to determine their needs and then select the best system for them.

7.2 Further development and continuation of project

As a further development, the first step is to start investigating the possibility of hosting a server in company's premises by using the already existing servers. Other possibilities have to be taken into consideration, too; for example, buying a virtual server hosted by another company and using that.

There will also be a need for defining suitable settings and properties for the selected documents management system. After that it has to be seen how processes fit the system. They should fit right in, but there might be some need for fine tuning and making processes more accurate and precise.

After that has been done, there will be the important issue of introducing the new document management system to its users. According to the survey done, the sentiment regarding new centralized document management solution should be positive. But this is still vital part as it determines how the system will be used or will it just stay in the closed for most of the employees.

REFERENCES

Anttila, J. 2001. Dokumenttien hallinta.

Sutton, J. 1996. Document Management for Enterprice: Principles, Techniques, and Applications.

Bourque P. and Fairley R. 2004. SWEBOK V3

Mehdi Khosrowpour, J. 2000. Challenges of Information Technology Management in the 21st Century

Laserfiche 2007. Document Management Overview. Pdf-tiedosto, http://www.laserfiche.com/pdf/ImagingGuide.pdf. Referred 25.01.2015.

Enterprice Content Management Webpages, http://www.contentmanager.eu.com/dms.htm. Referred 26.01.2015,

Document management systems Wikipedia, http://en.wikipedia.org/wiki/Document_management_system. Referred 22.01.2015

Web application Wikipedia, http://en.wikipedia.org/wiki/Web_application. Referred 29.01.2015

WhatIs.com webpages, http://whatis.techtarget.com/definition/metadata. Referred 29.01.2015

Arcflow the document managers webpages, http://www.arcflow.eu/arcflow/management/rights-management. Referred 29.01.2015

InformIT the trusted technology learning source, http://www.informit.com/articles/article.aspx?p=1622404&seqNum=22. Referred 02.02.2015

University of Leicester webpages, http://www2.le.ac.uk/services/research-data/organise-data/version-control. Referred 02.02.2015

Wildcard character Wikipedia, http://en.wikipedia.org/wiki/Wildcard_character. Referred 03.02.2015

Backup Wikipedia, http://en.wikipedia.org/wiki/Backup. Referred 03.02.2015

Internet document management system and methods patent, http://www.google.com/patents/US6584466. Referred 03.02.2015

ISO 9000 Introduction and Support Package: Guidance on the Documentation Requirements of ISO 9001:2008, http://www.iso.org/iso/02_guidance_on_the_documentation_requirements_of_iso_9001_2008..pdf. Referred 26.05.2015

JHS 173 ICT-palvelujen kehittäminen: Vaatimusmäärittely, http://docs.jhs-suositukset.fi/jhs-suositukset/JHS173/JHS173.pdf. Referred 24.3.2015

JHS 152 Prosessien kuvaaminen, http://docs.jhs-suositukset.fi/jhs-suositukset/JHS152/JHS152.pdf. Referred 24.3.2015,

M-Files, http://www.m-files.com/fi. Referred 18.4.2015

SeedDMS, http://www.seeddms.org/. Referred 20.4.2015

LogicalDOC, http://www.logicaldoc.com/. Referred 22.4.2015

Dokmee, http://www.dokmee.com. Referred 24.5.2015

Epicor, http://www.epicor.com/finland/Solutions/Pages/ProductDataManagement.aspx. Referred 24.5.2015

OMG Business Process Modeling Notation V1.1, http://www.omg.org/spec/BPMN/1.1/PDF/. Referred 25.5.2015

IEEE Recommended Practice for Software Requirements Specifications, http://www.math.uaa.alaska.edu/~afkjm/cs401/IEEE830.pdf. Referred 25.5.52015

CAE DS, http://webhotel2.tut.fi/projects/caeds/tekstit/PDM/PDM_PDM.pdf. Referred 24.5.2015

OpenDocMan, http://www.opendocman.com/. Referred 23.4.2015

Merriam-webster Dictionary, http://www.merriam-webster.com/dictionary/database. Referred 26.8.2015

Wikipedia: Database, https://en.wikipedia.org/wiki/Database. Referred 26.8.2015

Staff e-mail survey

Kysymyksiä dokumenttien hallinnasta:

Tarvitsetko dokumentin hallintaa / näetkö olisiko keskitetystä dokumentin hallinnasta apua päivittäisessä työssäsi?

Mistä dokumentin hallinnassa olisi sinulle eniten hyötyä/haittaa?

Millaisia tarpeita näet, että sinulla itselläsi on dokumentin hallinnan suhteen?

Haluatko, että siirrytään keskitettyyn dokumentin hallintaan ja miksi ei/kyllä?

Dokumentit työssäsi:

Miten hallitset tällä hetkellä dokumenttejasi? (esim. varastoit, eroittelet, jaat jne.)

Minkälaisia dokumentteja tuotat tai liittyy työtehtäviisi?

Mitkä niistä mielestäsi tulisi säilyttää ja ehkä jakaa muiden saatavaksi? (yleisesti)

Ovatko osa dokumenteistasi ”salaisia”?

Mitä dokumentteja tarvitset päivittäin ja ovatko ne itse tuottamiasi?

Dokumentin hallinnan ominaisuuksista:

Mitkä ominaisuudet ovat mielestäsi merkityksellisiä, jotta saat hyötyä dokumentin hallinnasta?

Arviointi 1-5, 1 = ei merkitystä; 2 = vähän merkitystä; 3 = oleellinen; 4 = tärkeä; 5 = elinehto

Kysymys?	Arviointi (1-5)
Pääsy kaikkialta	
Mahdollisuus jakaa dokumentteja yrityksen sisällä	
Mahdollisuus jakaa dokumentteja yrityksen ulkopuolelle	
”Kansio”-käyttöoikeudet (luku, editointi)	
Tiedostokohtaiset käyttöoikeudet (luku, editointi)	
Mahdollisuus hyväksyttää dokumentteja	
Mahdollisuus katsella dokumenttia (esim. web-käytttöliittymässä)	
Mahdollisuus muokata dokumenttia (esim. web-käytttöliitty-mässä)	
Poistaa dokumentti	
(Automaattinen) Dokumentin versionhallinta	
Hakutoiminnot: sisältö	
Hakutoiminnot: otsikon	
Hakutoiminnot: metatiedoilla	
Hakutoiminnot: asiakkaan	
Hakutoiminnot: päivän	
Hakutoiminnot: kansion	
Hakutoiminnot: tekijän	
Hakutoiminnot: muu mikä?	

Document management system comparison

	M-Files	SeedDMS	LogicalDOC	OpenDocMan
Accessible anywhere	Yes	Yes	Yes	Yes
Client OS (supported)	Any (Windows users have extra features with installable software, office integration etc.)	Any	Any	Any
***web-access**	Yes	Yes	Yes	Yes
***mobile app**	iOS, Android and Windows Phones	Yes	iOS and Android	No
Hostable server	Yes	Yes	Yes	Yes
***supported OS**	Windows Server, Vista, 7, 8 tai 8.1	Web server (PHP 5.3, MySQL 5 or higher installed)	Linux (Red Hat 6, SUSE 10, CentOS 5, Ubuntu 9), Mac OS X Lion or Windows (Server, 7 or 8)	Web server (MySQL 5, PHP5-enabled)
***database**	Firebird (embedded SQL	MySQL	MySQL, Oracle, Microsoft SQL Server,	MySQL

	engine) or Microsoft SQL server		PostgreSQL, etc	
***other required software**	M-Files Web activation requires Windows 2008 server or newer and IIS-server software aswell ASP.NET 4.0	PHP	Java JDK 7, Apache Tomcat, GWT, Lucene	PHP5
***hosting service**	Available for fixed price	Available for fixed price	Available for fixed price	Available for SecureDocMan
Access-rights	Yes, users and groups	Yes, users and groups	Yes, users and groups	Yes, users and groups
***file**	Yes	Yes	Yes	Yes
***folder**	Yes	Yes	Yes	Yes
Version control	Yes, old versions can be restored	Yes, change	Yes	Yes
***change log / audit trail**	Yes	Yes	Yes	Yes
***version comparison**	Yes	No	Yes	No
Import	Files and folders	No	ZIP archives	No
Search	Yes	Yes	Yes	Yes

***Quick search**	Yes	Yes	Yes	Yes
***Indexing**	Yes	Yes	Yes	No
***with meta-data**	Yes	Yes	Yes	Yes
***with content**	Yes	Yes	Yes	No
***with creator**	Yes	Yes	Yes	Yes
***with category**	Yes	Yes	Yes	Yes
***with created date**	Yes	Yes	Yes	No (sort available)
***with modified date**	Yes	Yes	Yes	No (sort available)
***with title**	Yes	Yes	Yes	Yes
Sharing files for users without access/account to DMS	Yes, email from DMS	No	Yes, email or download link from DMS	No
Preview document	Yes	No	Yes	No
Edit document	No	No	No	No
Backup	Yes	Yes	Yes	Not included in DMS
Folder structure	No	Yes	Yes	No
Workflow	Yes	Yes	Yes	Yes
***approval/review**	Yes	Yes	Yes	Yes
***customizable**	Yes	Yes	Yes	No
File stages	Yes	Yes	Yes	Yes
Integrations	Microsoft Office, Microsoft Sharepoint,	TYPO3	Dropbox, Microsoft Office, Google Docs, LDAP	None

	Microsoft Dynamics CRM, Salesforce CRM, NetSuite, Sage 200, AutoCAD, AutoDesk, Autotask, IBM (Lotus) Notes, SAP		and Microsoft Active Directory, Kofax – Metadata extraction	